CLAIMS

1. Apparatus for performing a transesophageal cardiovascular procedure, said apparatus comprising

an elongated tubular main access device having a first lumen with an open proximal end and a distal side opening;

inflatable sealing means on the outside of said device above and below said side opening, and

a first fluid conduit extending along said device for inflating said sealing means so that when the device is inserted into a patient's esophagus and the sealing means are inflated, the portion of the esophagus opposite said side opening is isolated from the remainder of the esophagus above and below the side opening.

2. The apparatus defined in claim 1 and further including

a second fluid conduit extending along said device, said second conduit having a proximal end for connection to a vacuum source and a distal end which opens adjacent to said side opening so that fluid may be sucked from the isolated portion of the esophagus.

3. The apparatus defined in claim 1

wherein said device has a second lumen with a rigid outer wall and a collapsible inner wall, said second lumen adapted to receive an elongated probe or surgical device, and

further including means for introducing a fluid between said inner and outer walls to collapse the inner wall against the probe or surgical device.

4. The apparatus defined in claim 1 and further including

perforate fluid channels formed in the outside of said device above and below said side opening, and

means extending along the device for conducting fluid to and/or from said channels.

5. The apparatus defined in claim 1 and further including a side access unit comprising

elongated flexible coaxial inner and outer tubes said tubes having proximal and distal ends and being moveable relatively in the axial direction and said inner tube having at least one lumen extending between said ends;

second sealing means mounted to the distal end of the outer tube;

third sealing means mounted to the distal end of the inner tube, and

means adjacent to the proximal ends of said tubes for moving said tubes relatively so as to vary the axial spacing of said second and third said sealing means.

6. The apparatus defined in claim 5 wherein the second and third sealing means comprise balloons or flanges.

7. The apparatus defined in claim 5 wherein the second sealing means comprise

a plurality of flexible, axially extending flaps mounted to the distal end of the outer tube, said flaps being movable between a collapsed position wherein the flaps are nested against the outer tube and an extended position wherein the flaps project radially out from the other tube, and

means for moving the flaps between said collapsed and extended positions.

8. The apparatus defined in claim 7 wherein the moving means comprise

elongated needles extending from the proximal end of the outer tube into said flaps, the segments of said needles in said flaps being curved so that rotation of said needles about their respective axes moves the flaps between said collapsed and extended positions, and

means at said proximal end of the inner tube for rotating said needles about their respective axes.

9. The apparatus defined in claim 7 and further including cooperating means on the distal ends of said first and second tubes for forming a purse string suture.

10. The apparatus defined in claim 5 wherein said third sealing means comprise

an umbrella mounted to the outside of the inner tube, said umbrella being movable between a retracted position wherein the umbrella nests against the inner tube within the outer tube and an extended position wherein the umbrella extends radially out from the inner tube beyond the distal end of the outer tube, and

means for moving the umbrella between its retracted and extended positions.

11. Apparatus for performing a transesophageal cardiovascular procedure, said apparatus comprising

an elongated flexible tubular shaft having a proximal end, a distal end and a wall extending between said ends;

a first lumen extending along the shaft, said lumen having an open proximal end near the proximal end of the shaft and an open distal end constituted by a side opening in the wall of the shaft near the distal end of the shaft;

first expandable sealing means on the side wall of the shaft and extending above and below said side opening;

expanding means extending along the shaft for expanding said first sealing means so that when the shaft is inserted into a patient's esophagus and the first sealing means are expanded, the portion of the esophagus opposite the side opening is isolated from the remainder of the esophagus above and below the side opening;

a fiber optic endoscope extending along the shaft said endoscope having a proximal end adapted for connection to a light source and a distal end located adjacent to said side opening for viewing the portion of the esophagus opposite the side opening;

an ultrasound transducer in said shaft near the distal end thereof, and

conductors extending along the shaft for connecting the transducer to an ultrasound transceiver.

12. The apparatus defined in claim 11 wherein the first sealing means comprise at least one inflatable balloon and the expanding means include a first fluid conduit for conducting an inflation fluid to and from said at least one balloon.

13. The apparatus defined in claim 12 and further including at least one vacuum port in the shaft wall adjacent to said side opening, and

a second conduit extending along the shaft, said second conduit having a proximal end for connection to a vacuum source and being in fluid communication with said at least one vacuum port so that a vacuum can be drawn in the isolated portion of the esophagus.

14. The apparatus defined in claim 13 and further including additional vacuum ports in the shaft wall spaced above and below said at least one vacuum port, said second conduit also being in fluid communication with said additional vacuum ports.

15. The apparatus defined in claim 11 and further including a light source connected to the proximal end of the endoscope and an ultrasound transceiver connected to said conductors.

16. The apparatus defined in claim 11 wherein said first lumen transitions gradually to said side opening.

17. The apparatus defined in claim 11 and further including an elongated probe or surgical device received in said first lumen said probe or surgical device having a working end which is deployable from said side opening.